A MEETING of the Society was held at the Royal Society of Medicine on Thursday, 13th October, 1977. The retiring President, Sir Norman Skelhorn, introduced his successor, Dr. Roy Goulding.

POISONING AS A FINE ART

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SIR NORMAN SKELHORN: Ladies and gentlemen, it is my pleasure to vacate the chair in favour of the incoming President, Dr. Roy Goulding. In doing so, I know that I speak for you all in wishing him the best in his tenure of office, which we hope will be exceedingly successful, as we are confident that it will be. I now invest him with the Badge of the President's Office. (*Applause*) I ask him to deliver his Presidential address.

DR. ROY GOULDING: Thank you, Past President. Ladies and gentlemen: of a president some years ago of another body, the Royal College of Physicians of London, it was said that he added a new dimension to the enormity of death. The explanation for this allegation was that annually during his term of office, where he embarked upon the customary duty of reciting the obituaries on the late lamented fellows, he embodied in his descriptions an unrestrained frankness and insensitive objectivity to the extent that his posthumous judgments verged more than once on scandalous condemnations. Not that I will treat you to a series of obituaries tonight, but the analogy, slight though it may be, intruded on my thoughts on seeing the latest issue of our own Medico-Legal Journal, which I received when preparing this address. Therein, Mr. Editor, you have printed a panegyric, no doubt composed by your enlisted eulogist, introducing me as the new president. Glancing at this has completely unnerved me and, I should add, my wife as well, for we have profound misgivings that we shall ever measure up to the excellence that the writer has promised you.

Nevertheless—and I mean this sincerely—both of us are acutely conscious of the honour which you, as a Society, have conferred upon us by elevating me to the office of president. I thank you genuinely and pledge myself, so far as I can, to uphold the standards and eminence of this role.

That brings me to the substance of this address. At once I am aware how considerate your rules are to the new incumbent, for the presidential item with which your programme opens is the only one in which subsequent questions and discussion are not permitted. I feel uncomfortably cast as a preacher, though I assure you there will be no sermonizing. You will appreciate, though, that this immunity may serve as an incitement to choose the most esoteric of subjects and to make quite untrammelled assertions.

For my topic this evening I have chosen that of "Poisoning as a Fine Art", as any of you knowing my professional preoccupation might have guessed. How, you may ask, is anyone persuaded into such a peculiar study, unless prompted by criminal or other nefarious aspirations? So far as I am concerned, the answer is simple; it was largely the disposition of fate. Briefly, I grew up in the country and among farms. To me, food production was a vital activity and over the last half-century this idea has become steadily reinforced, not least in this year of grace (or of impending Malthusian famine), 1977. Possessed of youthful idealism, I envisaged a happy bond between agriculture and health. So, armed with a degree in agriculture, I turned next to medicine, the war intervening. Doubly qualified and infused with high hopes, but enjoying no independent means, I sought gainful employment, only to be disappointed. It was then that I came under the mentorship of the late Dr. A. H. Douthwaite at Guy's and to him I shall always be indebted. He was not only a gifted clinician, but exhibited what at that time was an unusual and discriminating interest in drugs and medicines and the therapy based thereon. It was he who encouraged me in the pursuit of pharmacology and, more especially, the incorporation of this discipline into medical practice. In those optimistic and carefree days, all drugs were regarded as conferring unqualified benefits and blessings. I happened to be in at the beginning of the pharmaceutical bonanza. Gradually though, percipient physicians, if not surgeons, were becoming aware of the duality of medication, of the Jekyll and Hyde of drugs. It was later that the thalidomide disaster brought events to a crisis. Virtually overnight pharmaceuticals became the object of vilification and I became converted into a toxicologist, bringing the same appraisal to bear on much the same substances, but using a different yardstick.

Over these same years an awareness of poisoning and its possibilities had developed in other fields. During the early 1950's some farm workers had been killed by a particular agricultural pesticide that they had been handling. Incidents of harm from new synthetic chemicals had also come to light among factory workers, beyond the lead, mercury, toxic gases and other hazards that were already known to occur. Among paediatricians, too, there was a growing perplexity about children brought to hospital with the story that they had come into contact with, or swallowed, some-or-other household product, maybe of a novel nature. Finally, and more insidiously, came the fear of environmental pollution, accentuated by the horrifying epidemic of casualties from organic mercurials in the Minemata Bay area of Japan and the depredations among certain forms of wild life, notably predatory species, from the so-called persistent, organochlorine insecticides, such as DDT, aldrin and dieldrin. All of these ingredients of doubt and fear were blended to create a toxicity scare on a global scale and, as ever, partial and unconfirmed evidence led to grossly distorted judgments. The politicians and the purveyors of the mass media could hardly neglect this unsolicited—though far from heaven-sent—opportunity to make sensational capital from it. Government reaction was inescapable. The Committee on Safety of Drugs or, eponymously, the Dunlop Committee, was set up to regulate the testing and marketing of new medicines. A scheme of voluntary, yet effective, control over agricultural and horticultural pesticides was devised jointly between the Ministry of Agriculture, Fisheries and Food and the relevant industries. Later the Department of the Environment emerged and took upon itself the surveillance of chemicals that might adversely affect the community in its widest sense. More recently, on the occupational front, we have seen the advent of the Health and Safety at Work etc. Act, which embodies provisions to avoid toxic hazards.

In the medical sense the then Ministry of Health, in co-operation with Guy's Hospital and its Medical School, stimulated and generously assisted by past-president of this Society, my friend Professor Keith Simpson, brought into being the United Kingdom National Poisons Information Service in 1962. As Director of this project I came into the act and so have remained ever since.

I will not bore you tonight with a recital of that organization, if only because I had the privilege of talking about it to this Society some years ago. What I must reiterate is that our primary obligation is the prevention and treatment of poisoning in man. Our remit does not extend to the veterinary territory, nor to the various forms of wild life—no matter how you care to interpret that expression. Further, we do not function under the aegis of medical jurisprudence, though from time to time we discover that legal consequences can arise from the illness of individual patients. Yet it is mainly because of the special expertise which others believe we command that we are enlisted by our legal colleagues and associates to act as toxicological advisers, or sometimes as expert witnesses. This can be my only authority for addressing such a mixed audience this evening and for meriting the appellation which appeared in a letter to me from a firm of solicitors a year or so ago, wherein they invited my advice as, to quote their own words, a "poisonous expert". (*Laughter*)

So far my review has extended little further back than the last two decades. I would now like to recall with you the earlier history of poisoning—not the tedious trials of Maybrick, Seddons, Armstrong, Crippen, and the like, or the hypothesising about Napoleon being the victim of arsenic (I can leave such dissertations safely to the journalists), but to the toxic excesses dating back to centuries before Christ. In this way, I think, the subject takes on a philosophical complexion, to which I alluded in my Adams Lecture to the Royal College of Surgeons of Ireland in 1967.

To me it always appears that, by contrast with the prosaic, dismal and pathetic forms in which poisoning currently presents, it was in past ages more romantic, glamorous and intriguing—except, of course, for those who were the victims.

In the Medico-Legal Journal for 1952, the late Professor Sir Sydney Smith gave a fascinating account of "Poisons and Poisoners through the Ages", mentioning the cuneiform writings of Sumeria, dating from about five thousand years ago, with their allusions to drugs and poisons, while from the Egyptian papyri it is clear that Menes, the first of the Pharaohs, "cultivated and studied poisonous and medicinal plants about 3000 B.C." Indeed, in those days, Egypt attracted quite a reputation for itself as a warehouse for both the materials and knowledge of poisoning, the toxic properties being appreciated of arsenic, antimony, copper, lead, henbane, mandrake, hellebore, aconite and hemlock, together possibly with hydrocyanic acid distilled from peach and other kernels. Greek legendary literature is replete with the heroics of poisoning and no one forgets that Socrates met his end by the executioner administering the hemlock cup.

The figure, however, that I find most appealing is that of Mithradates, King of Pontus, who flourished (if that is the right word) in the second century BC. He was in constant fear of being poisoned by his numerous enemies so, to protect himself, he proceeded to take by mouth a whole series of toxins in turn, first in minute doses and then in steadily increasing the amounts. His aim was to induce a state of polyvalent resistance, thus ante-dating the modern science of immunology by more than two millennia. Whether he was ultimately successful has never been proved, though there is reason to believe that he survived well on in life and was finally defeated in battle.

Even more fascinating was that creature known to the Ancient Persians as the "Poison Maiden". I quote from Elgood. "It was the belief among many peoples that it was possible to feed a girl on poisons and thus make her so venomous that a kiss or act of sexual intercourse would prove fatal to her lover. Avicenna speaks of a girl so dosed with poison that the noxious insects which bit her were themselves poisoned". What if the first of these possibilities were to be exploited in, say, the sleazier dens of Soho? "Stripping" would take on a new significance. I can see the "Porn Squad" giving way to the "Sex Poison Squad" and a group of carefully selected and highly immunized CID personnel combining with the best brains of the forensic science laboratories to combat this subtle crime, Or should we welcome the strategic dispersal of these seductive maidens among our infested farm and garden crops as the latest development in the biological control of insect pests, to supplant the dangerous sprays on which growers have come to depend?

If one ponders upon the "Poison Maiden" one realises the well-nigh disproportionate extent to which, historically, women have figured in toxic extravagances. Bombaugh has cogently featured this aspect in the Johns Hopkins Bulletin of 1899, thereby earning for himself, in all probability, the prototype award of the "male chauvinistic pig".

I was going to retail the stories of many of these women, but felt that this part had better be omitted for fear of my being branded as a "chauvinistic pig" as well. Yet I cannot help avoid mention of that unchallenged champion among these venomous fiends, Marie-Marguerite d'Aubray, the Marquise de Brinvilliers. "She visited the hospitals of Paris," so it was said, "particularly the Hotel Dieu, day after day, in the guise of a Sister of Charity, to experiment upon helpless invalids. In the course of this diabolical work she often produced effects as mere aggravated symptoms of the maladies she was ostensibly endeavouring to alleviate and, while outwardly tender, compassionate and sympathetic, she succeeded in sending a large number to the dead house without incurring suspicion."

I am not averring that there is a feminine monopoly of murder overall. Can it be, though, that the fairer, or should we say the gentler, sex is chromosomally more elegantly attuned so that when it comes to "Murder as a Fine Art", to borrow de Quincey's title, the ladies choose the refined and subtle techniques in preference to, say, bludgeoning with a cudgel, blasting with a gun, or the grotesquerie of strangulation?

I have tried to avoid an anti-feminist diatribe. I just wanted to introduce this feminine side of the activity to emphasize the element of motive in poisoning, in so far as it is nearly always a premeditated and calculated business, whether directed at self, or at someone else. Only rarely is it impulsive. The women to whom I have referred have been driven to their degradation by a sense of retribution, ambition, triumph, or sometimes by no more than a macabre satisfaction. So it is with the men. These performances cannot be reduced to "quantitation", if I can be forgiven for this abhorrent, scientific neologism. In the toxicological laboratory we set out to be dispassionate. We classify substances according to their LD_{50}s, for designated animal species—rats, mice, guinea pigs, and so on. This is no more than a statistical concept designed to eliminate variables. It is a useful tool but, as an index of toxicity, it should never be confused with hazard which relates to the practical risk in the clinical or criminal situation.

In our Poisons Information Service we are repeatedly asked what is the fatal dose of, for example, a barbiturate, a tranquillizer, a pesticide, a household product, an industrial solvent, or whatever else you care to name—for man. Such figures I am sorry to see are commonly listed in so many textbooks of forensic medicine. Yet they are artificial values. They must not be isolated from the circumstances. In the debilitated person, crippled with chronic respiratory disease, as little as a therapeutic dose of morphine can be catastrophic. At the other extreme, it can be accepted that de Quincey, like any other confirmed opium addict, could resort with equanimity to daily libations of the drug that would instantly have killed a normal person lacking his induced tolerance. This is a fundamental principle of practical toxicology that must never be disregarded.

Among the ancients, devoid of any scientific constraints, what mattered was the intention and the outcome. In the eleventh century AD the Arabs favoured "duel by poison". Each contestant was obliged to take the other's nostrum, the recipient thereupon having to marshal an antidote that was at once swift and effective. It is recounted that on one such trial of strength the "first doctor's draught was fierce enough to melt black stone", but his adversary conjured up an adequate antidote right away. "Then the second doctor picked a rose, mumbled an incantation and asked his antagonist to sniff the flower. The first doctor complied and promptly fell dead. Fright had killed him, for the rose was only a rose". As Sigerist has summed up the attitude, ". . . the primitive concept of poison was totally different from ours. To us a poison is a chemical substance that is harmful to the organism and destroys it when it is given in a certain concentration. The individual resistance may vary within limits, but given in a certain quantity the poison will invariably kill a person. To the primitive the substance that we consider as a poison is indifferent in itself. It is guilt that activates it and makes it deadly".

On reflection it is unlikely that any of those treacherous women whom Bombaugh indicted could have been convicted on toxicological grounds. They were condemned solely on circumstances. There were no autopsies and no post-mortem analyses. The clamour nowadays that is voiced principally by politicians, consumer organizations and the like, statutorily to schedule this, that and the other substance as a poison, closely to regulate its sale and supply and to label it accordingly, may, as I see it, be somewhat misplaced. In this respect I regard the bureaucrats among the EEC as being numbered as some of the worst offenders. By animal testing sodium hypochlorite has a high, acute oral toxicity. Yet we have never seen a serious case of poisoning from household bleach, of which that chemical is the principal constituent. On the other hand, common salt, liberally traded as an article of diet, was used by a mother successfully to poison her own child; while we have a series of deaths from this same material vouchsafed over-zealously, but in all good faith, as no less than an antidote to poisoning.

So I come to the discipline of analytical toxicology. Before this came into being during the early part of the nineteenth century, toxicology could boast no scientific respectability at all. For this reason some would dismiss altogether the authenticity of the vast historical literature on poisoning into which I have delved already. Pioneering the analytical approach was Orfila, a Spaniard, born in Minorca; he spent the greater part of his working life in France, until his death in 1853. He was closely followed, though their times overlapped, by Alfred Swaine Taylor who, I am glad to say, was none other than Lecturer in Medical Jurisprudence and Toxicology at Guy's Hospital here in London. By exercising quantitative techniques in the laboratory, they lent critical elucidation to the investigations of death by poisoning.

Over the past century and a half these activities have expanded throughout the world, encouraged sometimes by government sponsorship, so that our own official forensic science laboratories constitute almost a model. Their concern has been primarily with the detection of crime and the apprehension and conviction of malefactors. Their measurements analytically have largely been related to an all-or-none effect, death or survival. The amount of toxin found in a dead body may happen to be the precise dose proving fatal, a gross excess, or indeed a quantity insufficient in itself, for other factors or even other noxious agents remaining unsuspected and so undetected could have contributed to the fatal outcome.

Impressive though the toxicological findings may have been, it is only over the last two or three decades that the laboratory instrumentation and methods have achieved a semblance of specificity, sensitivity and reliability. Only recently, therefore have we been enabled to extend these procedures beyond the dead house to the hospital ward, in the diagnosis and treatment of poisoned patients. Blood, urine and, occasionally, tissue levels of toxins can be correlated to the clinical manifestations, while the fate and elimination of poisons can be monitored in the body as an aid to patient management. In this way we have been able to look more critically at some of the treatment regimes adopted empirically and to advance novel procedures, such as extra-corporeal haemoperfusion, in which process I think our own unit has been in the vanguard. Further, by way of biochemical research, it has been possible to classify the cellular mode of action of particular poisons so that "tailored" antidotes could be devised as, for example, with paracetamol overdose.

Mention of such overdose leads me to the epidemiology of poisoning as we see it today, at least in Britain and likewise in the greater part of the western world. Homicide by this means is rare; mainly, I think because this type of crime seldom escapes detection and retribution. Nevertheless, the physician—and for that matter anyone else—must always, as Keith Simpson has enjoined, "have a suspicious mind where poisoning is concerned"; adding, as he does so urbanely, "The most disarming personality may be a cultured veneer to a black soul". Only two years ago members of this Society heard a talk by Professor Donald Teare on paraquat poisoning, the clue to which might easily have been overlooked but for the discernment of a probation officer.

Accidental poisoning of adults is, nowadays, unusual. Casualties can still arise inadvertently from carbon monoxide, though far less so than when coal gas constituted the bulk of the domestic supply. Other toxic gases and vapours can occasionally be occupational hazards. In Britain, moreover, mishaps with pesticide chemicals are of remarkably low incidence. On the other hand, the statistical returns issued annually by the Registrar General indicate that poisoning from drug overdose taken unintentionally is still quite common. I doubt this. These tabulations are a compilation from coroners' verdicts. I trust I am not being unfair to members of this profession when I say that, individually and as a class, they are charitable characters. They pronounce suicide only if the features of the case leave no alternative. The more we study the psychological attributes of adults who are the subjects of drug overdose, the more we become convinced that the act is nearly always deliberate. Indeed, today we are faced with what has been expressively declared to be an "epidemic" of self-poisoning.

In England and Wales alone more than 80,000 adults are admitted to the hospitals each year having had recourse to self-poisoning. This is the commonest single cause of acute medical illness. It is salutary to discover, on questioning these patients, that only a minority have set out determinedly to kill themselves. Most of them, in a state of depression, dejection, hopelessness or inadequacy, have just made a gesture of poisoning and in this way have uttered, as the psychiatrists explain, a "cry for help".

What we have found at Guy's Hospital, which is reflected in the reports from Edinburgh, Sheffield and Newcastle-upon-Tyne and is surely representative of the country as a whole, is that more than eighty per cent of these people seen in hospital are in no physical danger. They recover uneventfully with little more than nursing care and, apart from their need for psychiatric or, better still, socio-psychiatric support, they are fit to leave the ward within a day or two. This immense load on our health service must surely serve as a reproach to our social hygiene and a censure on our so-called civilization. Our paramount task is to overcome and prevent this parlous situation but, to date, endeavours to that end have failed.

A few of these people—all of them being untutored in pharmacology—either select an agent more toxic than they thought, or ingest what turns out to be an excessive dose. They are then physically at risk and it behoves us medically to do all we can to save them, even though we are at the same time aware that some of them can exhibit a penchant for this form of deviancy so that their successive individual hospital admissions can extend to eighteen or twenty occasions.

Meanwhile, there are a few members of the population who are firmly resolved upon self-destruction. Truly these people are suicidally inclined. They may shoot themselves, hang themselves, drown themselves, throw themselves under a train, thus leaving no room for mistakes. If they turn to drugs, they collect an immense overdose for the purpose. Approximately three out of every four of these people are found dead from their acts. The remainder, when they reach hospital alive, are desperately ill.

Separate from these melancholy adults, there is another section of the population that gives rise to anxiety—some might go so far as to add disproportionate anxiety—over poisoning. Here I am thinking of the children—those between one and five years of age and, principally, those between one and three years. During this stage they have moved away from the constant maternal care and dependence and as independent beings are beginning to explore the world around them. They have yet to learn discretion. Their predominant sensory faculty seems to reside with the mouth and the tongue, into which anything within reach is inserted. They are omnivorous; anything and everything is grist to the oral mill—coal, pencils, detergent, perfume, bleach, plant leaves, dog medicines, fly spray, shoe polish and, more ominously, tablets and capsules for human medication that seem to adorn every home in the kingdom. Naturally the mother, on finding her beloved youngster in the act of eating, drinking, swallowing or just rubbing his or her face with anything inappropriate, is alarmed by the possibility of poisoning. There is an immediate appeal to the doctor or, more frequently, to the casualty department. Twenty thousand small children are admitted annually to the hospitals of England and Wales in this manner, understandably, as a precaution. Only a tiny proportion of them show any symptoms or are poisoned in the true meaning of the word. This is because most of requisites found in the homes of this country are relatively innocuous. Where trouble does emerge is invariably when human medicines have been guilelessly swallowed. We have thirty to fifty deaths a year on this account. Above all is a need for a more enlightened and unemotional approach. For those domestic articles which, it is clear from our hundreds of case records, are relatively harmless, warnings and cautionary labelling and unnecessary tears should be avoided. Much more care, though, should be directed towards the tablets and capsules. Education here, has largely failed, so some method of child-resistant packaging should become obligatory.

Perhaps we should not overlook the possibilities of toxic disasters in the community. Fortunately, in Britain, we have so far escaped the tribulations of anything resembling Seveso. We, nevertheless, have our near misses, if only at sea.

A 35,000 ton container vessel was crossing the Atlantic eastwards from the United States. The seas had been turbulent and there had been much pitching and rolling. A day out from the port of arrival four seamen were detailed to undertake a routine check of all the holds and, thereafter, they all complained of fever, headache, muscular pains, nausea and vomiting. Later they noticed that their urine was deeply coloured, but this they tended to dismiss because, as they explained, they had been "on the beer" the night before. As their state worsened, all four were lifted ashore by helicopter. It was known from the ship's manifest that among the containers were cargoes of seventeen potentially toxic chemicals. Could any of these, we were asked over the telephone, account for an illness of this kind? This query was wearily repeated to us by a succession of doctors into whose care the patients were entrusted. Our answer was consistently no, but we did venture that acute arsine poisoning was a possibility. But it was affirmed that this chemical was not aboard and, anyway, it had no commercial use and, therefore, was unlikely to be transported. So far as we could ascertain, there were none of the factors—as one often gets at metal works—likely to lead to the adventitious release of this gas.

The patients were later that day transferred to a specialist liver unit and, once more, the catechism with the Poisons Information Service was renewed. Clinical management, I am glad to say, proceeded as for arsine, with exchange transfusion and care of the renal function. All these men eventually recovered, though renal impairment and neuropathy persisted for some months.

Persistent inquiry among the shippers immediately after the accident had led to the disclosure that two large cylinders of pure arsine had been loaded into a container in New York but had not been declared on the bill of lading. These cylinders had been prominently labelled as highly poisonous and "to be stowed on deck". Yet they had not only been thrown into a container, but loosely into this container, the only other content of which, believe it or not, was a small consignment of the volatile anaesthetic halothane.

Even if expert medical care ensured the survival of the four victims, that was not the end of the story. The ship was still contaminated and the offending container was located two layers down in a hold, with three superimposed layers as deck cargo. An elaborate manoeuvre was performed under the surveillance of more than one Government department and to the accompaniment of no less than a Royal Navy destroyer escort. The ship itself, with a small volunteer crew, put to sea as soon as possible and, in the Western Approaches, with other human life and navigation kept at a distance—including a Russian trawler—proceeded to blow off as much of the arsine as possible by means of the hold fans. With this dispersal completed in two days, course was set for Rotterdam, the only convenient port with off-loading facilities well away from habitation. The containers were there lifted off and the critical one was put on a raft. Hypochlorite, as a neutralizing agent, was introduced through a hole bored in the wall. The doors were then opened at sea and the two cylinders were found—one with the cap and valve grossly damaged as it had rolled about and the other apparently still intact. Men fully equipped with protective clothing and respirators put both cylinders into another boat. The damaged one, on pressure testing, proved empty. Worse still, it was decreed that the other one should be emptied as well. So the boat was towed into an unfrequented part of the North Sea and volunteers—and a motley crowd they were—attired as previously in protective clothing (there was some difficulty because they all had large beards), allowed the gas to escape slowly and blow away in a convenient wind to the protest of the environmentalists but, thankfully, with no further casualties.

It was only then learned that arsine is widely used in the electronic manufacturing industry, that it had been regularly and safely shipped in cylinders as a deck cargo for years and that this loading of the cylinders into a container so occasioning the poisoning in this instance was due to carelessness bordering on the culpable. And as the *Asia Freighter,* for such was the vessel named, finally cruised away into the sunset, no longer a toxic hazard, we all reflected upon the problems—clinical, transport and environmental—that had thereby been raised.

Since I have proceeded so far without saying anything about the legal aspects of poisoning, I can sense you commenting, what about rectifying this if only for the lawyers within the audience? I repeat, we are not a hospital forensic department. Personally, though, I do find myself engaged, as the opportunity presents, on toxico-legal disputes. I am certain you will prefer not to be burdened with a plethora of case summaries with which many of you, in any event, will be all too familiar. I have decided nontheless to give you a few examples.

An engineer on the staff of a National Health Service hospital, going about his duties, had some water spurt into his eye from a boiler which he was attending. That eye, oddly enough, had been the site of a previous elective operation for cataract. The water in question contained a sludge conditioner; in other words, a dilute solution of caustic chemicals. It was alleged that because the employing authority had failed to take adequate precautions the vision in that eye was entirely lost. To begin with we had no prior knowledge of the nature of the chemicals nor of their action upon a normal eye and, less still, upon a post-cataract eye. We had no option but to undertake a series of experiments—in animals, I must concede, for any of you with anti-vivisectionist feelings—before we could form any worthwhile toxicological opinion to lead to a settlement.

Then there was a large cargo vessel in dock, the holds and deck accommodation of which had been fumigated with hydrogen cyanide and methyl bromide by a firm specializing in this work. Subsequently, an erstwhile fit and active engineer-officer returned aboard and fell from a deck gangway, thereby being so injured that he was disabled for life. Legal action was taken upon his behalf because, it was said, the residue of the toxic chemicals had rendered him ataxic and caused him to fall. A neuro-surgeon was prepared to testify vigorously in his favour. To draw up a reasoned toxicological argument, the most detailed information had to be assembled—about the properties of these gases, physically and biologically, the nature of the fall, the condition of the man when he was taken to hospital and so on. This was not just toxicology, but applied toxicology. In some ways I was relieved that a settlement was agreed before I had to submit to cross-examination in court.

On another ship in dock four men were employed on painting an enclosed sludge tank. The precise form of their protective accoutrement was in some doubt. Suddenly one of these fellows, of erstwhile stable temperament, appeared, as one of his colleagues observed "to go mad" and fall into the dock, injuring himself. It was claimed that he had been overcome by "thinners" incorporated into the paint which he was applying. Toxicologically this seemed to us unlikely. Then came the complication (not entertained, incidentally, by the claimants) that, if the vessel had been a tanker, there might have lingered in it a residue of lead tetra-ethyl, or some analagous organo-lead petroleum additive, that could bring about just this anomalous behaviour.

I come now to pentachlorophenate, a chemical of which the toxicity is well established, which is known to pass through the skin and from which characteristic toxic reactions can follow. One cold, overcast and windy morning a man, muffled in a coat, scarf and cap, went to adjust the tarpaulin over his lorry. In so doing he tipped over a paper sack which tore, so that the contents, powdery sodium pentachlorophenate, spilled over him. He was said to have coughed a little and his eyes were sore but, apart from these, he suffered no other immediate ill-effects and proceeded about his business as a driver for the rest of the day. Another three days elapsed before he sought medical help and then for an influenza-like illness, which soon resolved spontaneously. Some weeks later, however, he was beset by an incapacitating muscular paralysis. Now there are reports in the medical journals of pentachlorophenates being neuro-toxic, but they are almost entirely the work of only one neurologist and are not unreservedly acclaimed by his specialist confrères. The poor patient, seen by another neurologist, was diagnosed as being possessed of a hysterical overlay upon an underlying organic nerve damage. When this man was referred to me I could not convince myself that this was correct. What bothered me in his history was the absence of any acute reactions to the chemical. Again, we did some experiments. This time a human volunteer was forthcoming and he was exposed dermally to increasing amounts of the same sample of this chemical for progressive periods of time. Careful monitoring was conducted throughout of this person's metabolic state and the urine was tested by sensitive analysis for phenols. There was no indication from these studies that any of the chemical had been systemically absorbed. Further, it was separately ascertained that this powder sample was of a particle size exceeding the limits of respirability. What interested me in retrospect was to look at the cautionary labelling attached by the manufacturers to the pentachlorophenate container. It was terrifying in the message it conveyed and I am not at all surprised that anyone reading this and then being showered ever so lightly with the powder could thereupon be the object of the most devastating symptoms.

This prompts me to dwell on the complexities and conflicts with which we have to grapple toxicologically before ever we reach the forensic disputation. Take first what we archly denote as the "scientific literature". Any ardent researcher or medical man, possessed of the strangest of theories, or activated by a "bee in his bonnet", seldom fails utterly to find some journal or another that will publish his notions. A paper thus in print is well-nigh sanctified and not readily refuted. Not long ago there appeared in no less a publication than the British Medical Journal a report that a group of middle-aged farm workers who had, intermittently, come into contact with a diversity of pesticides had all been rendered incapable of performing maritally with the same prowess and frequency as in the past. As I have pointed out elsewhere, when men begin to lose face—if that is the apt expression here—at least concupiscently, they are loath to admit their own inadequacies or the toll of the years. Sexual vanity is appeased if some external agency can be inculpated. Yet this account has been adopted as gospel in connection with a number of claims.

In addition to civil actions the toxicologist may, of course, be called in expert aid for criminal proceedings. A young man was charged with rape, the complainant having supposedly taken a battery of tranquillizer tablets beforehand. The question was did they, or did they not, influence her consent? I was unacquainted with any experimental work, either at my own initiative or anyone else's, dealing with this exact predicament. Deducing what the young woman's disposition might have been under those circumstances was an art of toxicological acrobatics, not of expert opinion. I was relieved to find that I was not called in the hearing.

Another man was charged with murder by stabbing. In defence it was pleaded that he was prey to reactive depression at the time of the alleged offence. In substantiation it was pointed out that he had tried to commit suicide prior to the killing by swallowing an overdose of paracetamol. I was asked to say what was a suicide dose, how that compared with the dose he did ingest as calculated from his blood levels and what the effects might have been upon him. This was toxicological projection in the extreme and as such commanded little significance for either judge or jury. The psychiatrists, as you can imagine, revelled much more in this affair of inexactitudes than a mere toxicologist.

A third man was accused of wilfully administering drugs to a three-year-old child. She had been seen shortly afterwards in hospital, a reliable clinical record of her condition then was to hand and blood level measurements had been taken. How many tablets had been involved and when might they have been ingested? It happened that in our own laboratory we had been investigating blood levels after different doses and after succeeding intervals of time. A fairly valid extrapolation was therefore feasible in this instance.

In conclusion, if I have ranged widely over the subject of poisoning—historically, clinically and forensically—my object has not been just to impress you. My thesis, instead, is that toxicology cannot be reduced to a circumscribed, objective and quantitative system—except, perhaps, with animals in the laboratory. With man, the circumstances, the multiplicity of operative factors and the motives are all relevant and, in the forensic context, insistently so.

In our speciality, therefore, we must never abandon the quest for accuracy just as, correspondingly, we must cultivate the art of interpretation. Nor can any of us afford to be dogmatic, any more than we can venture beyond our expert limitations. There is consequently scope for a genuine difference of expert opinion. That is why I am opposed to the oracular concept of the medical, or toxicological, assessor to the court, preferring our own adversary system with its examination and, more so, cross-examination of witnesses, in our quest for ultimate truth and justice. (*Applause*)

MR. LEONARD CAPLAN: Ladies and gentlemen, I am most happy that it falls to me to give expression on your behalf to our feelings with regard to the interesting, fascinating and informative address which we have just heard from our new President. What I have to express is our feeling of gratitude—gratitude in a double sense—and that is: thanks for what we have received; and gratitude in the other sense of the definition of gratitude, which is a lively expectation of good things to come, because, with our new President presiding over us for the future period of his office, we now have a foretaste of the success with which he will do so.

Traditionally, this vote of thanks is one which requires no seconding. Traditionally also, you will be glad to hear, this vote of thanks is one which is supposed to be given in short terms. I am a great traditionalist: I therefore ask you to accede to the vote of thanks which I propose. All those in favour please signify. (*Applause*)

THE CHAIRMAN: Thank you very much. The meeting is now adjourned.

(*The proceedings then terminated*)

CONTEMPORARIES RECEIVED

British Journal of Addiction
British Medical Journal
Bulletin de Médécine Legale et de Toxicologie Médicale
Central African Journal of Medicine
Criminal Law Review
International Criminal Police Review
Journal of the Auckland Medico-Legal Society
Journal of the Forensic Science Society
Journal of the Indian Law Institute
Juridical Review
Justice of the Peace
Lancet
Law Quarterly Review
Medical News Tribune
Medicine Science and the Law
Police Journal
Solicitors' Journal
World Medicine